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Specification and Drawings, as originally filed, with Application for Patent Serial No:  
2,386,557, on May 15, 2002, by EARTH ANGEL INC., assignee of John Phillip Brown,  
for "Frame for Attachment to a Dock Structure Having Means to Receive Containers".

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**ABSTRACT**

**A frame adapted to receive containers, particularly empty plastic beverage containers, such as two-liter plastic pop bottles, and adapted to be attached to a dock structure. When the dock structure, frame and bottles are in mutual cooperation, the containers provide buoyancy to the dock structure. The containers are preferably screwed into the frame and may be removed.**

**FRAME FOR ATTACHMENT TO A DOCK STRUCTURE HAVING MEANS  
TO RECEIVE CONTAINERS**

**BACKGROUND OF THE INVENTION**

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This invention relates generally to flotation devices such as, for example, cottage docks; floating bridges such as those used by all terrain vehicles, lawn tractors, golf carts; island docks, mooring docks for boats; floats for an anchor; or boardwalks. More specifically, the invention relates to a frame into which empty containers such as plastic beverage bottles are screwed and which can be attached to a dock or the like. Hereinafter the term dock structure will be understood to imply one of a cottage dock, floating bridge, island dock, mooring dock for boats, float for an anchor, boardwalk, or other similar structure.

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Devices using plastic bottles as a means of flotation have been proposed in the art such as in United States Patent No. 5,235,929 entitled Docking System issued to Leisure Docks Inc. on August 17, 1993. That patent teaches a device made up of several modules, each module comprising a deck and side walls to form a hollow chamber in which plastic containers are adhered to each other, to the side walls, to the deck and to points on the bottom of the module. The device fails to provide an arrangement which allows for easy installation or replacement of bottles by a user. In addition, the patent fails to teach a device adapted for attachment to a dock.

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**SUMMARY OF THE INVENTION**

According to an aspect of the present invention, there is provided a frame adapted to be attached to a dock structure and having means to receive empty containers, such as plastic beverage containers. When the dock structure, frame and containers are in mutual cooperation, the containers provide buoyancy to the dock structure. The means for receiving the containers may include female screw portions into which male screw portions of the containers

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can be screwed, ideally in fluid-tight manner. Preferred containers are two-liter plastic drink bottles. The frame includes a means to allow attachment of the frame to a dock structure such as holes by which the frame may be attached to a dock structure with fastening means such as screws.

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The present invention provides a frame with or without containers associated therewith and with or without a dock structure associated therewith.

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A dock structure may be provided with additional features such as, for example, a towing means in order to aid in towing the device on land and/or on water, a ladder, recreational features, and the like.

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The arrangement of the frame may be such that when all of the female screw portions are filled with containers, the containers come into contact with each other or, alternatively, such that the bottles are slightly spaced and do not come in contact with each other.

#### BRIEF DESCRIPTION OF THE DRAWINGS

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Figure 1 is a perspective view of a frame according to an embodiment of the present invention;

Figure 2 is a perspective view of the frame of Figure 1 into which two bottles are screwed;

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Figure 3 is a perspective view of the frame of Figure 1 into which 25 bottles are screwed; and

Figure 4 is a perspective view showing four frames according to an embodiment of the present invention into which bottles are screwed and which are attached to a dock structure.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A frame 1 according to an embodiment of the present invention is illustrated in Figures 1 to 3. The frame 1 is illustrated on its own in Figure 1 and in cooperation with bottles 2 in Figures 2 and 3 as described below. The frame 1 comprises a surface 4 and an array of female screw portions 3 thereon. The female screw portions 3 are each of substantially cylindrical form with a threaded interior. The female screw portions 3 are adapted to receive male screw portions of bottles 2 such as two-liter plastic pop bottles. The female screw portions 3 comprise eight supports 5 extending in an outward radial direction with respect to each screw portion 3. The surface 4 includes apertures 6 which can be used to attach the frame to a dock structure 7 as seen in Figure 4 in which four frames are used.

Arrangement of the female screw portions 3 relative to the surface 4 is dependent on the size of the bottle to be used and the desired shape of the surface 4. The size and dimensions of the female screw portions 3 are dependent on the size and dimensions of the male screw portions of the bottles 2 which are to be used. If a standard two-liter plastic bottle is to be used, the diameter of each female screw portion should be approximately 1 1/8 in. and if a square grid configuration having contacting bottles is desired (as seen for example in Figure 3), the distance between the centers of each of the female screw portions 3 should be approximately 4 3/8 in. In such a square grid configuration adapted to result in contacting bottles, the dimensions of the surface may advantageously be 1' 6 3/4" by 1' 6 3/4" and if bottles 2 are screwed into the frame 1 the outer dimensions of the array of bottles are 1' 9 7/8" by 1' 9 7/8".

In one embodiment of the present invention the frame and, in particular each female screw portion, is adapted to cooperate with an inner gasket to help ensure an air-tight seal. Such a gasket may be provided as part of the frame or otherwise.

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Many different sizes and shapes of the frame 1 are contemplated for use in conjunction with a variety of dock structures. In fact, multiple frames 1 may be used with a single dock structure as seen in Figure 4. The shape of the frame 1 is not specifically limited and could be, for example, annular, triangular, rectangular and may include at least one internal cavity such as in a donut shape.

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Because the bottles are screwed into the device, should one or more bottles become damaged, it/they may be replaced without the need for an involved procedure requiring special tools. The replacement may preferably be performed by the end user.

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An alternative to the female screw portions is another means to receive containers such as two-liter pop bottles, such that the attachment is removable, secure and provides a good seal such as a clamp or a plug, over which the open end of the bottle can be pressed to create a secure structure and fluid-tight seal.

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In an alternative embodiment the frame comprises a means to secure containers in place using a locking system in order to prevent potential tampering. In another embodiment, the frame comprises a means to secure containers in place so that the containers are not readily removable.

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Referring to a system using a frame of the present invention, certain bottles may be partially filled or substantially filled with a liquid such as water, in order to adjust the flotation and buoyancy characteristics. The degree and geometric properties of flotation are dependent, in part, upon which female screw

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portions are occupied, that is, the location and number of bottles which are in place. In one embodiment, means to hold the bottles in tight cooperation is provided in order to distribute the stresses. Such a means may be a strap which can be placed around the bottles or may be provided by a dock structure.

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A dock structure used in conjunction with a frame of the present invention may include many features such as a means of anchorage, ladder or slide.

**THE EMBODIMENTS OF THE INVENTION FOR WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A frame for attachment to an underside of a dock structure to provide buoyancy thereto, comprising:
  - a generally planar frame portion;
  - a plurality of receiving members, attached to said frame portion and each adapted to receive a hollow container by holding and sealing an open end of said container; and
  - means for attaching said frame to the underside of a dock structure, such that said containers depend from said frame and provide a buoyancy effect to said dock structure.
2. A frame according to claim 1 wherein each receiving member comprises a female screw portion adapted to receive a male screw portion of one of said container.
3. A frame according to claim 1 or 2 wherein each receiving member comprises a substantially cylindrical portion extending normally from said frame portion and a plurality of supports extending in an outward radial direction with respect to said cylindrical portion.
4. A frame according to claim 1 wherein each receiving member comprises a clamp adapted to receive said containers.
5. A frame according to claim 1 wherein each receiving member comprises a plug adapted to receive said containers.
6. A frame according to any one of claims 1 to 5 wherein said attaching means comprises a plurality of apertures in said frame through which fastening means, used to attach said frame to said underside of said dock structure, may be inserted.



7. A frame according to claim 6 wherein said fastening means comprises at least one screw.
8. A frame according to any one of claims 1 to 7 wherein said containers comprise two-liter plastic drink containers.
9. A frame according to any one of claims 1 to 8 wherein said dock structure is a structure selected from the group consisting of a cottage dock, floating bridge, island dock, mooring dock for boats, float for an anchor and a boardwalk.
10. A frame according to any one of claims 1 to 9 wherein each receiving member comprises an internal gasket to enable an air- and fluid- tight seal between each receiving member and said container.
11. A frame according to any one of claims 1 to 10 wherein each receiving member is oriented to enable the containers to extend substantially normal to said frame.
12. A frame according to any one of claims 1 to 11 wherein said receiving members are positioned on said frame in a grid to allow said containers to be arranged in a grid form.
13. A frame according to any one of claims 1 to 12 wherein said receiving members are positioned on said frame such that when the containers are held by said receiving members, each container contacts at least another container.
14. A frame according to any one of claims 1 to 13 wherein said frame portion is substantially in the form of right angle quadrilateral.

15. A frame according to any one of claims 1 to 14 wherein each receiving member comprises a lock which may be used to prevent potential tampering.
16. A frame according to any one of claims 1 to 15 comprising a plurality of said receiving members and a plurality of containers attached thereto.
17. A frame according to any one of claims 1 to 16 further comprising said dock structure attached thereto using said attaching means.
18. A dock system comprising:
  - a dock structure; and
  - a plurality of frames according to any one of claims 1 to 16;
  - wherein said frames are attached to an underside of said dock structure using said attaching means.

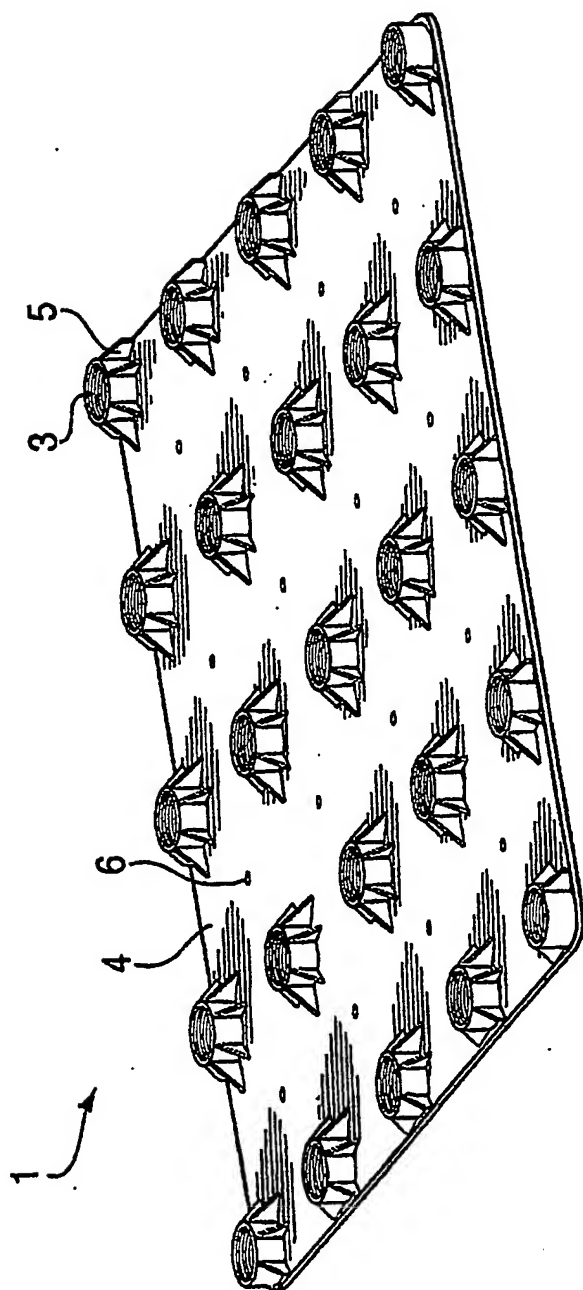


FIG. 1

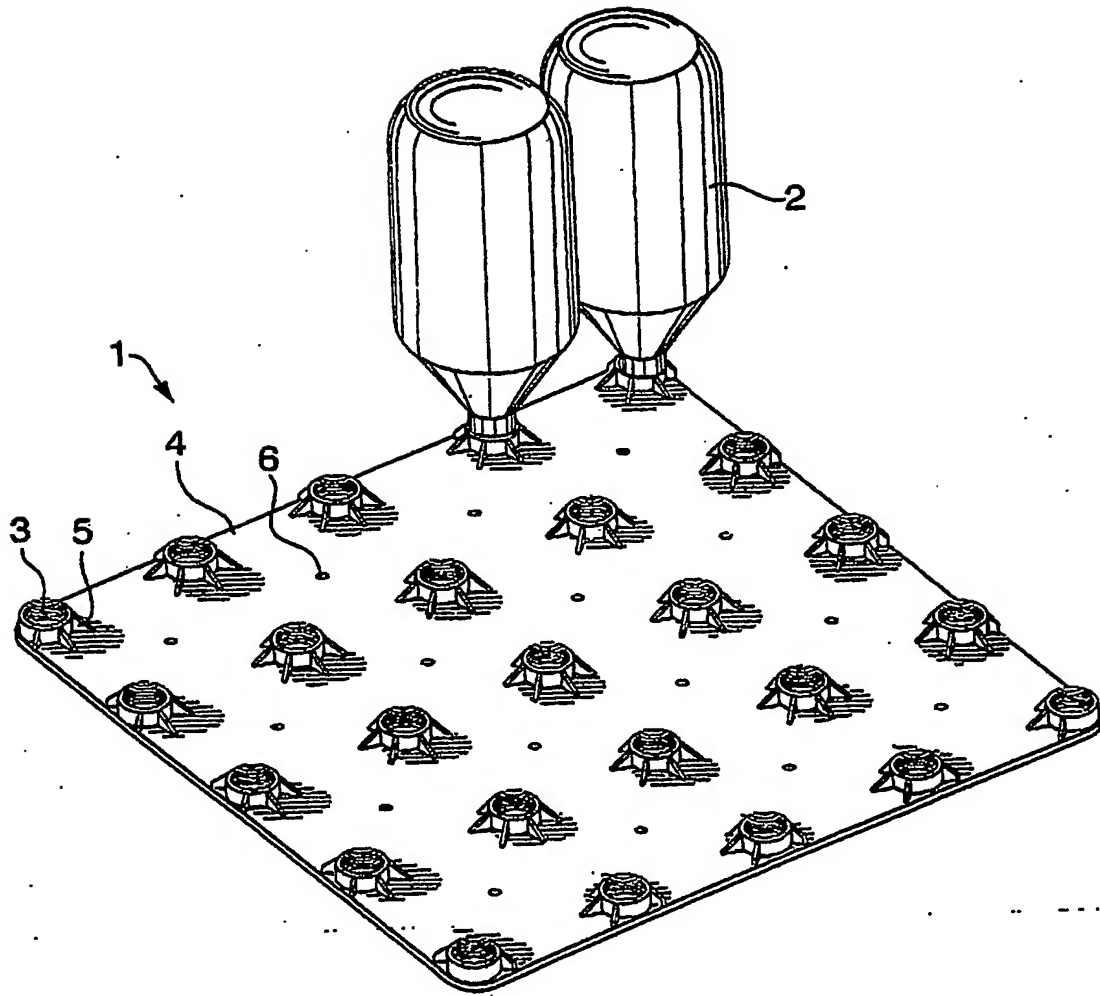


FIG. 2

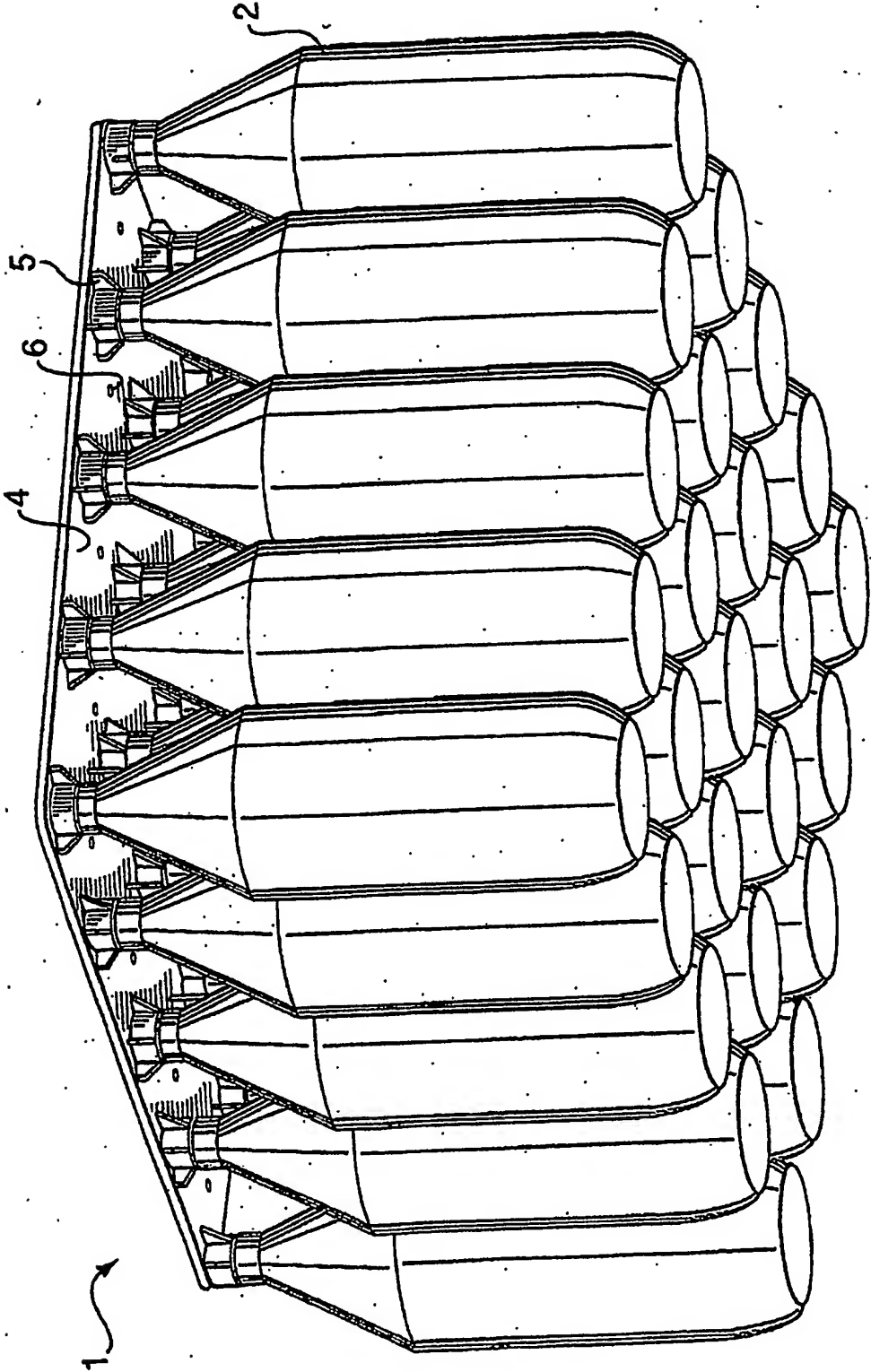


FIG. 3

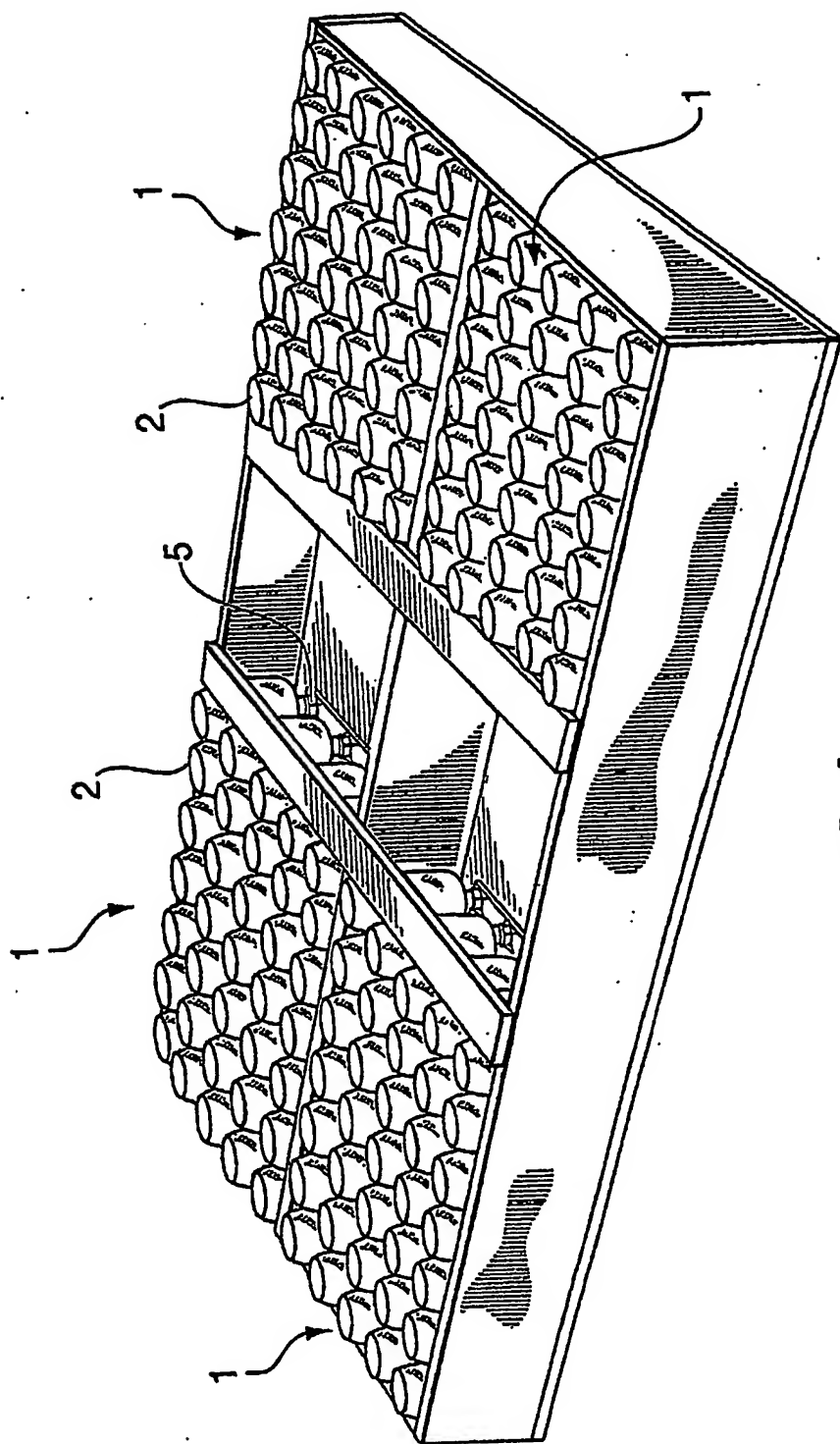


FIG. 4